

ABSTRACT

The present invention realizes a quantum circuit and a quantum computer capable of performing multi-bit quantum computation. A quantum bit is represented by the polarization directions of light, a sequence of polarized light pulses representing a quantum bit string is sequentially supplied, and the amount of polarization rotation applied to a certain light pulse and the amount of phase difference are determined on the basis of a result of the measurement of polarization of the preceding input light pulse sequence, thus realizing a controlled-unitary transform. In addition, regarding the light pulses representing the quantum bits, the number of photons included in one pulse is larger than 1, resulting in a reduction of the influence of error.